

fatbox G3

THE MANUAL

If it is for demanding HSPA+ M2M and IoT deployments that require Security with Smart Remote access., the FATBOX G3 router is a hardy and robust gateway suited for Ethernet and Serial Port equipped devices. Lab tested and certified for CE and FCC part 15.

EDITION 01.2 / DEC 2015

DESIGNED IN AUSTRALIA. ASSEMBLED IN USA.

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SAFETY OF USE



ALL CONDITIONS

All specialist electronic devices must be operated with due care to avoid damage or injuries and should be installed and operated by a trained personnel.

DO NOT OPERATE THIS EQUIPMENT IN ENVIRONMENTS CONTAINING POTENTIALLY EXPLOSIVE GASES OR LIQUIDS, EXAMPLE, GAS STATIONS AND CHEMICAL PLANTS AND EXPLOSIVE STORES.

POWER SET UP

Inadequate current or dips in voltage may cause the device to fail to connect to data services even if the LEDs are lighted up. Supply over 30 VDC will damage the device

SIM CARD

Never remove or insert SIM card when device has PWR switched in “ON” position. Damage caused to device or SIM in such case will not be warranted.

CONFIGURING THE ROUTER

Do not reboot/power-down the device until the writing process is acknowledged as completed.

ABOUT

1.1

G3 SPECIFICATIONS

G3 DUO FOCUS

SECURITY

The core thinking behind the G3 hardware and software design is the layering of security in the modes of access.

INTEGRATION

Lower system cost while improving reliability by integrating simple user scripts to automate simple data or input monitoring and alerts management

CELLULAR INTERFACE

- HSPA+ 14.4Mbps downlink and 5.76Mbps uplink over 850/900/1900/2100MHz bands
- GSM 850/900/1800/1900 for GPRS and EDGE
- LTE (EU/Asia) option available on request
- RX Diversity antenna for optimum performance

OPERATING SYSTEM

- Linux on ARM Cortex-A9 (IMX6 Solo/Dual/Quad options)

SERIAL INTERFACE

- RS-232/RS-485 $\pm 15\text{kV}$ ESD Protected
- Integrated TCP Serial server

LAN INTERFACE

- 2 X 10/100BaseT Ethernet port
- 24VDC POE (Passive Input)

OPERATING CONDITIONS

- | | |
|-------------|---|
| POWER | · 12~24VDC (0.4/0.2A/0.1A @12VDC Peak/Nominal/Idle) |
| TEMPERATURE | · -40°C ~ +75°C Operating Temperature |

MANAGEMENT

NETWORK ROBUSTNESS

- Designed for maximum uptime from available network
- End-to-End PING connectivity testing with Reboot
- Configurable PPP keep-alive function

SECURITY

- IP firewall
- IPSEC (PSK) VPN for secure networking

NETWORKING

- DYNDNS and Port Forwarding

MANAGEMENT

- SMS to Reboot function to remotely reboot router (LUA Script)
- AT over Ethernet LAN e.g. to send SMS from a PLC
- AT over serial (custom firmware)

USER CUSTOM PROGRAMMING

- Lua scripting for user programed functionalities
- Available 2GB of on-board flash data storage
- Reduce cost and time to remotely manage equipment

GPS (FUTURE OPTION - PLS CONTACT US)

- Serial or Ethernet access to GPS data
- User on-board application to GPS data

ABOUT

1.2
HARDWARE

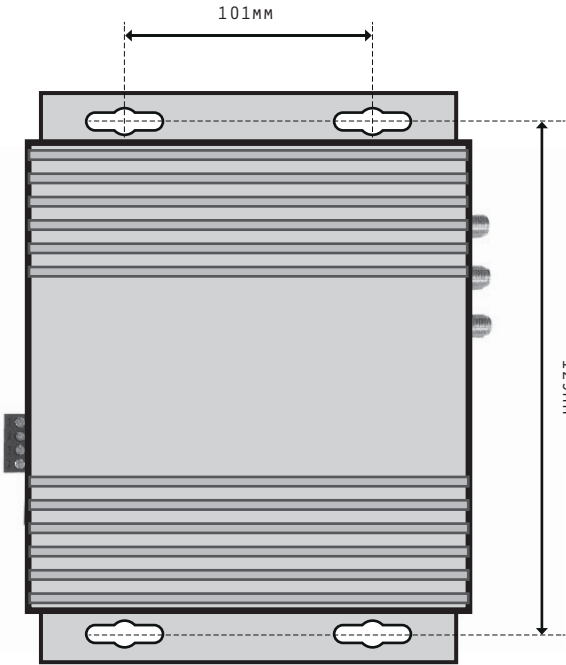
The FATBOX G3 is available in two versions.

STANDARD VERSION

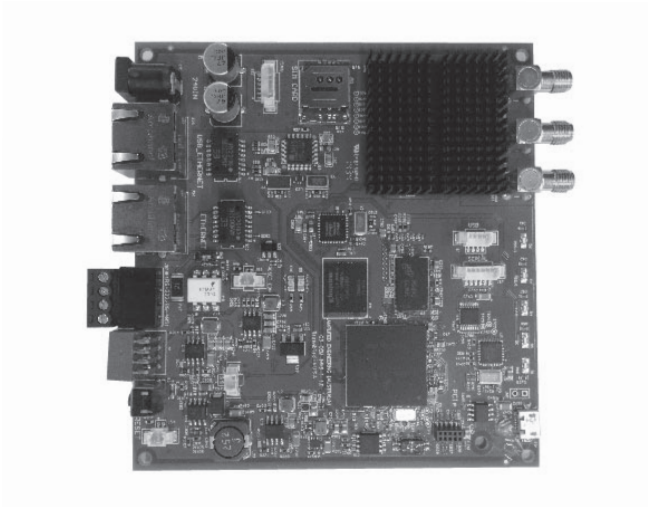
With rugged anodized aluminium chassis



NOTE: The client is required to have their own mounting screws (M3 size) to suit the surfaces the G3 will be on.



OEM VERSION



VERSION SPECIFICATIONS

	OEM	STANDARD
INTERFACE		
- LAN	●	●
- SERIAL	●	●
- I/O	●	●
- USB	●	●
DIMENSION		
- L	114mm	149mm
- W	108mm	111mm
- H	19mm	37mm
INTEGRATED MOUNTING		●
WEIGHT	110g	375g

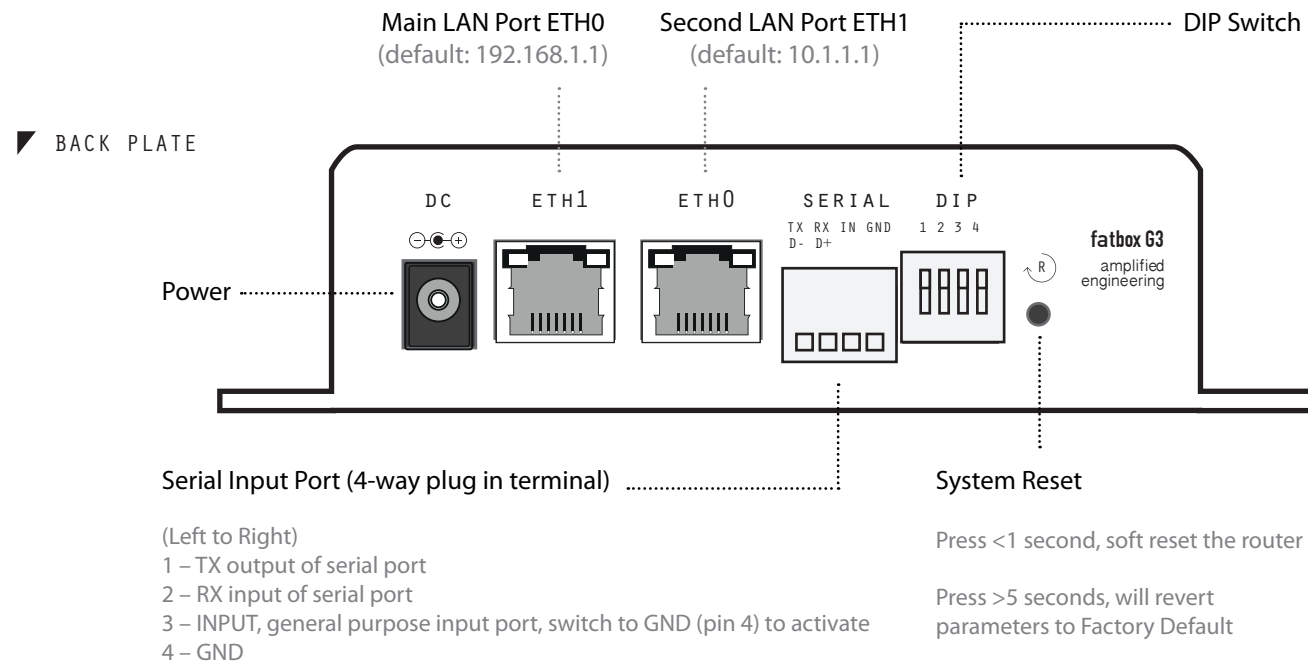
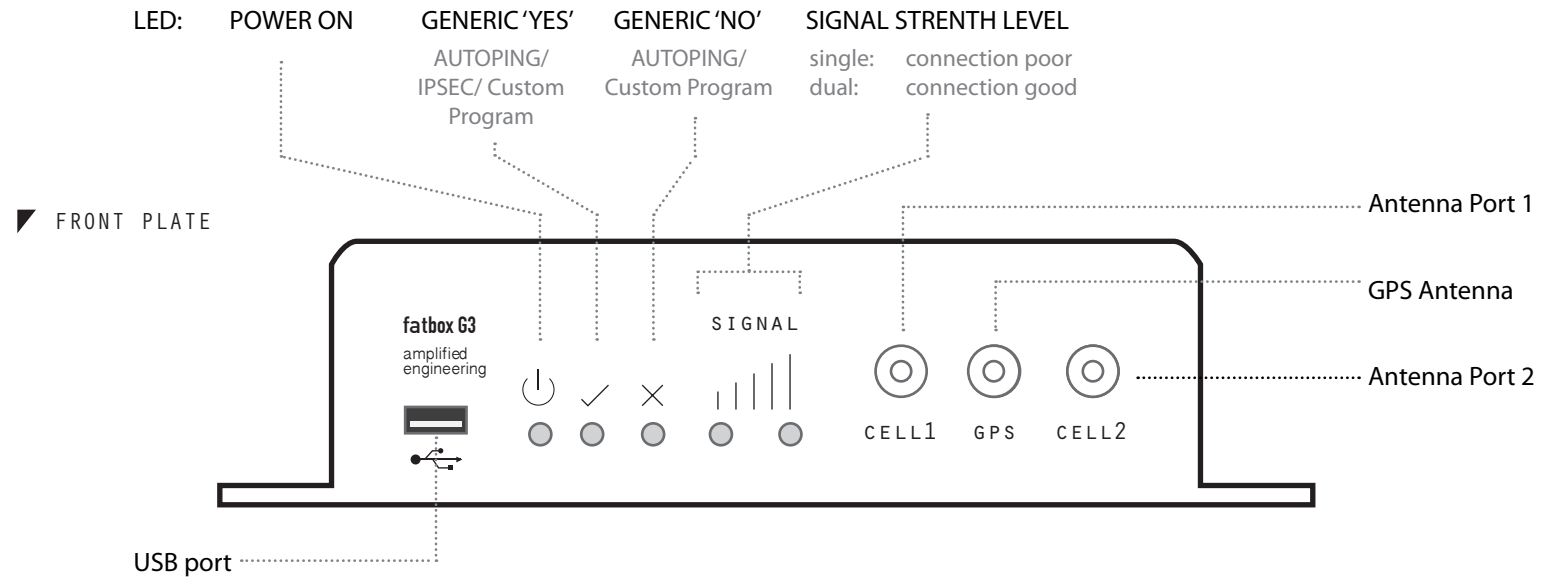
PERIPHERALS INCLUDED

- GSM antenna (with 2M wire)
- High-gain outdoor antenna option
- CAT-5 LAN cable (3M)
- Power supply unit (230/110VAC to 24VDC 0.5A)

ABOUT

1.3

BOARD INTERFACE



(Left to Right)

- 1 – TX output of serial port
- 2 – RX input of serial port
- 3 – INPUT, general purpose input port, switch to GND (pin 4) to activate
- 4 – GND

Press <1 second, soft reset the router

Press >5 seconds, will revert
parameters to Factory Default

This is a 4-way general purpose switch available to user application program. DIP #4 (right-most) is dedicated as 'TEST MODE'* which is activated when DIP #4 is in 'OFF/ down' position during power up.

*

During 'TEST MODE', after power up is stable (e.g. 1 minute) a program will monitor a switch (contact between #3 and #4 of Serial Input Port)

Press #1, if INPUT (#3 of Serial Input Port) is working, LED 'YES' will blink once

Press #2, with a 'loop back' wire connected between #1(TX) and #2(RX) of the Serial Input Port. The LED 'YES' will blink twice

Press #3, once a 3G/GPRS/EDGE session is established, LED 'YES' will blink three times

SETTING UP

2.1 SIM INSTALLATION

WHAT YOU'LL NEED

①

3G Data Enabled micro SIM
Card

②

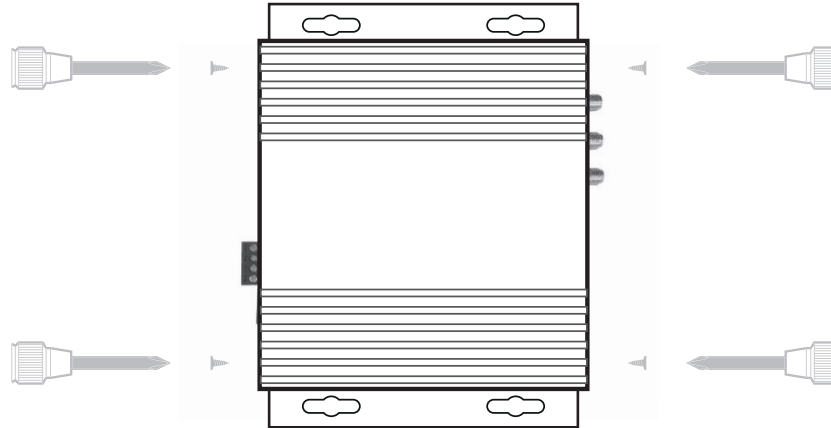
PC/Laptop with an
Ethernet port

③

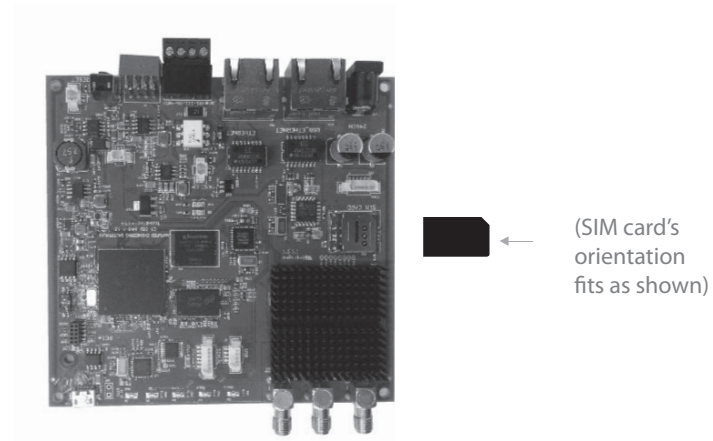
SIM card network details –
APN/USERNAME/PASSWORD.
You would need to get this
information from
your operator.

INSERTING THE SIM CARD

STEP 1 of 6 - Dismantle the casing cover and slide out the PCB. Avoid touching the electronics, handle the board by the edges.



STEP 2 of 6 - Insert your micro SIM card into the SIM card slot. Push the metal latch left/right to lock/unlock. Reassemble the metal casing.



STEP 3 of 6 - Connect the power adapter/antenna and plug the Ethernet cable to your pc.

STEP 4 of 6 - Power up the FATBOX G3.

SETTING UP

2.2

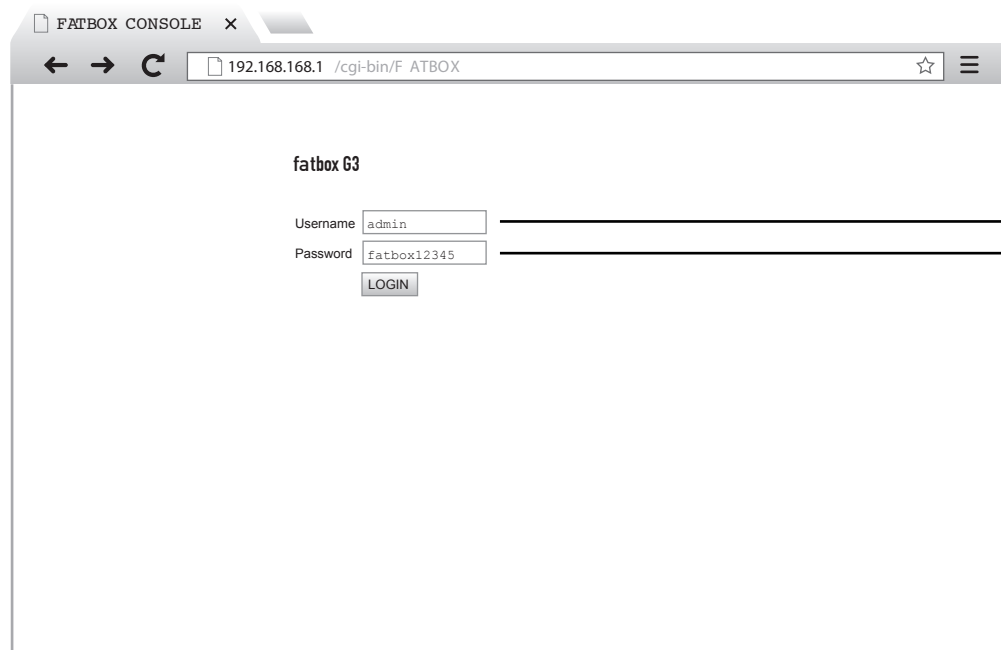
LOGGING IN

When you have connected up the hardware to the box, the web console can be accessed at the address **192.168.1.1**

For Security, after your first successful log in, you will be prompted to change your username & password.

STEP 5 of 6 - Launch your browser and enter address as 192.168.1.1

STEP 6 of 6 - Log in.



The screenshot shows a web browser window with the title 'FATBOX CONSOLE'. The address bar displays '192.168.1.1 /cgi-bin/F ATBOX'. The main content area shows the 'fatbox G3' login interface. It includes a 'Username' field with the text 'admin', a 'Password' field with the text 'fatbox12345', and a 'LOGIN' button. Two lines from external text blocks point to these fields: one to the 'admin' username and another to the 'fatbox12345' password.

The default username is:
admin

The default password is:
fatbox12345

WEB
MANAGEMENT

3.1
QUICK START

► The Quick Start tab brings all the settings you need to establish an immediate connection into a single page.

fatbox G3

MENU OPTIONS Basic Settings for FATBOX 3G router for 3G WWW access

- Quick Start**
LAN Ethernet
WAN Cellular
Port Forwarding
Dynamic DNS
IPSEC VPN
Serial Port
Management
System Status
Logout
- LAN (eth1 and eth0) Port Settings
LAN IP Address
LAN Netmask

3G HSUPA Cellular Settings
APN
User Name (PAP/CHAP only)
Password (PAP/CHAP only)
SIM PIN Code (If required only)

192.168.168.1

255.255.255.0

your_apn

UPDATE

Sets the IP address of LAN port on FATBOX G3

Mask for setup range of subnet IP addresses

Please check with your operator on this.

Setup the PIN code (usually 4-8 digit numerics) if SIM PIN lock is enabled

This saves the settings onto the G3.

fatbox G3

MENU OPTIONS	LAN (eth0 + eth1) Port Settings
Quick Start	
LAN Ethernet	LAN IP Address
WAN Cellular	LAN Netmask
Port Forwarding	DHCP Disabled
Dynamic DNS	DHCP Start
IPSEC VPN	DHCP Limit
Serial Port	
Management	
System Status	
Logout	
	Advanced Settings
	LAN Masquerade
	Specific LAN device Masquerade
	eth MAC

192.168.168.1

255.255.255.0

1

100

150

1= disabled 0=enabled

e.g. xxx.xxx.xxx Start

Limit

0

1= Enabled, 0=Disabled

1c:bd:0e:00:00:01

UPDATE

xx.xx.xx.xx.xx/xxx

xx.xx.xx.xx.xx

Sets the IP address of LAN port on FATBOX G3

Setup the FATBOX G3 to automatically assign IP addresses to your connected LAN devices.

This would be the starting address for connected devices. For the example above, the first device connected would be assigned 192.168.1.100.

This would be the limit for number of connected devices. For the example above, the last device connected would be assigned 192.168.1.150

This is to enable/disable masquerade

IP masquerading allows internal machines that don't have an officially assigned IP addresses to communicate to other networks and especially the Internet. Set this to the specific device on your network.

Sets the Ethernet MAC address of the FATBOX G3

WEB MANAGEMENT

3.3 WAN CELLULAR

► In the example, the FATBOX G3 would send a PING to 'www.google.com' every 15 seconds.

If 4 consecutive PING failures occur, the FATBOX G3 would attempt to re-establish a connection.

If it fails to establish a connection after 5 tries, the G3 will reboot itself.

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MENU OPTIONS

Quick Start

LAN Ethernet

WAN Cellular

Port Forwarding

Dynamic DNS

IPSEC VPN

Serial Port

Management

System Status

Logout

WAN Cellular

APN

User Name (PAP/CHAP only)

Password (PAP/CHAP only)

SIM PIN Code (If required only)

Advanced Settings

Dial Number

Service

Assigned DNS

PPP Keepalive

Enable Reboot on Ping Failure

Remote PING Host IP address

PING Retry Time Period(s)

PING retries

The screenshot shows the 'Advanced Settings' page for WAN Cellular. The settings are as follows:

- APN:** your_apn (Annotation: Get this information from your operator)
- User Name (PAP/CHAP only):** (Empty field)
- Password (PAP/CHAP only):** (Empty field)
- SIM PIN Code (If required only):** (Empty field) (Annotation: Setup the PIN code (usually 4-8 digit numerics) if SIM PIN lock is enabled)
- Dial Number:** *99# (Annotation: Please check with your operator on this. It is usually *99# or *99***1#)
- Service:** UMTS Preferred (Dropdown menu) (Annotation: To override domain name server (e.g. Google DNS server 8.8.8.8))
- Assigned DNS:** (Empty field) (Annotation: To override network assigned DNS)
- PPP Keepalive:** 5 (Annotation: This figure is the number of times the FATBOX would attempt to establish a data connection with your Telco before it reboots itself)
- Enable Reboot on Ping Failure:** 1 (Annotation: This enables the FATBOX to reboot on Ping failures)
- Remote PING Host IP address:** www.google.com (Annotation: Enter the IP address/ website which you would ping)
- PING Retry Time Period(s):** 15 (Annotation: This is the time taken before each ping would be sent)
- PING retries:** 4 (Annotation: This is the number of times it retries before the FATBOX G3 would attempt to re-establish a connection)
- UPDATE:** (Button) (Annotation: UPDATE and restart FATBOX)

WEB
MANAGEMENT

3 . 4
PORT
FORWARDING

The port forwarding function enables remote connections to specific devices (like IP cameras) or services within a private local-area network (LAN).

IP Camera Example

An IP Camera is connected to the G3 via ethernet. Its details are

IP address : 10.1.1.100.
Webserver port : 1500.

The device is set up to forward ports 1000-2000 from the FATBOX and route any data from those ports to 10.1.1.1000.

Alternatively you can set it as a single port instead of a range.

fatbox G3

MENU OPTIONS

Port Forwarding

Quick Start

LAN Ethernet

WAN Cellular

Port Forwarding

Dynamic DNS

IPSEC VPN

Serial Port

Management

System Status

Logout

Add a new Port Forwarding Rule

Source Port

Destination LAN IP Address

Destination Port

Service

1000-2000

Singe Port: XXX or Range of Ports: XXX-XXX

10.1.1.100

Enter the destination IP address of where you would want to forward the incoming data from sent to the ports you set up earlier

1000-2000

Enter the port number of your device where you would want the incoming data to go to. If you entered a range of ports, you would need to enter the same range here. You would need to check on the ports for this depending on your application/ device.

TCP and UDP

Select a Protocol to be used for your device. Common options found are UDP, TCP or Both. In most cases you will need to select the protocol option "TCP and UDP". This will associate both protocols to the port(s) being forwarded.

ADD

Can take up top 5 minutes

Current Port Forwarding Rules

Index	Source Port	Destination IP	Destination Port	Protocol
-1	1000-2000	10.1.1.100	1000-2000	tcp/udp

After clicking ADD, the details of your settings will be shown automatically.

If you have Dynamic DNS set up (refer to page 13), you can use a regular PC with an internet connection and input "<yr_hostname>.dyndns.org:1500" into the browser. You would be able to access the webserver on the IP Camera.

WEB
MANAGEMENT

3.5
DYNAMIC DNS

The Dynamic DNS feature helps to keep a standard domain name pointed to the FATBOX even if its assigned IP changes during reboot/reconnection.

WHAT YOU’LL NEED TO USE
DDNS

①

A data sim card with a *public IP* [You can check this with your operator.]

②

An account with dyn.com

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MENU OPTIONS	
Dynamic DNS	
Quick Start	Enable
LAN Ethernet	
WAN Cellular	Host Name
Port Forwarding	DDNS Service Username
Dynamic DNS	
IPSEC VPN	DDNS Service Password
Serial Port	
Management	
System Status	
Logout	

1

1 = enable 0 = disable

G3.dyn.org

your_username

your_password

UPDATE

Key '1' here to enable a dynamic DNS capability

Enter in the host name with which you have registered a DDNS service (eg. dyn.com)

Key in your DNS Service Username

Key in your DNS Service Password

Update to save your settings

The FATBOX G3 would connect to your account and point the domain you set to the FATBOX after you reboot.

EXAMPLE

In the above example, the Hostname is set as:

G3.dyn.org.

You will be able to access the FATBOX using the domain name "G3.dyn.org" on the browser of any regular PC with an Internet connection.

WEB MANAGEMENT

3.6

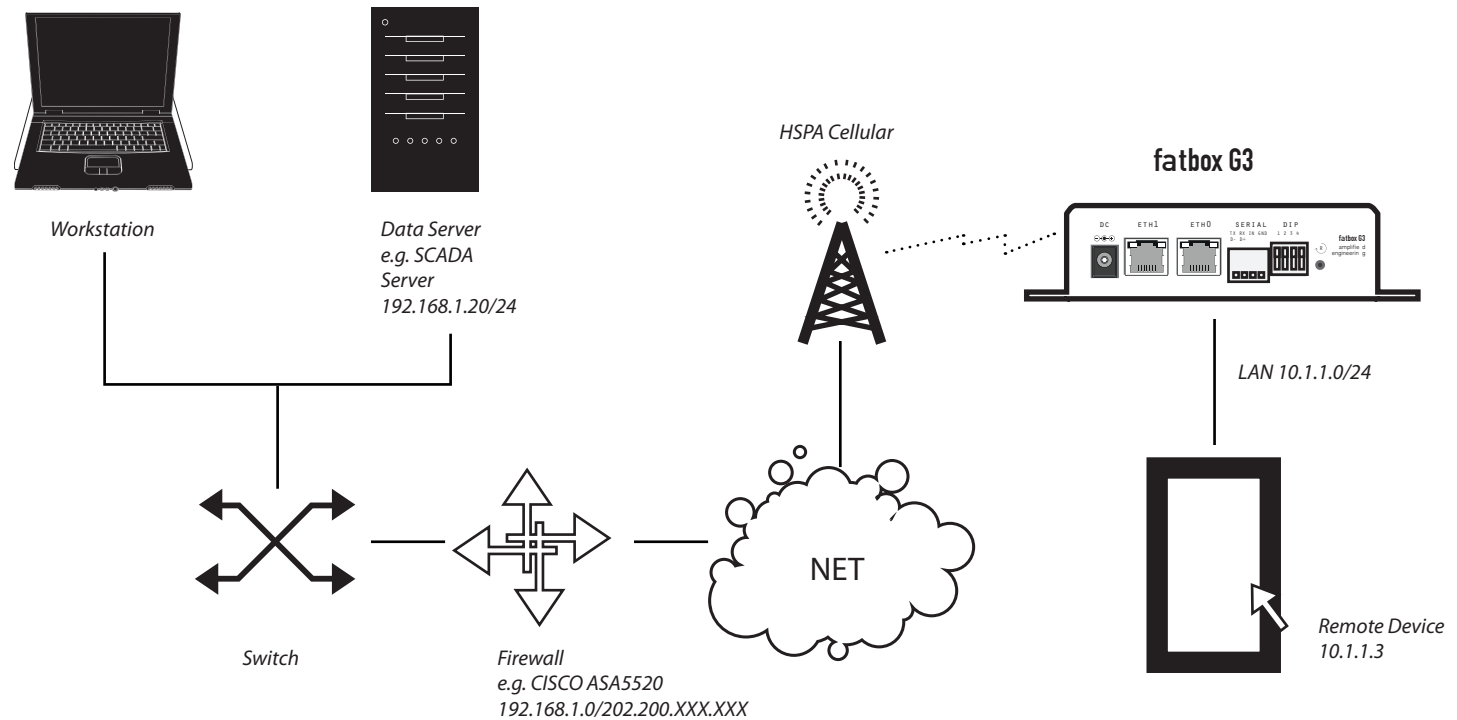
IPSEC VPN

FATBOX G3 integrates **Strongswan 5.0** IPSEC VPN client to enable secure encrypted networking and communications to your remote Ethernet and serial port devices.



EXAMPLE. (Site-to-Site (L2L) IPSEC VPN Tunnel 192.168.1.0/24 -- 10.1.1.0/24)

After the remote end-point (e.g. a CISCO ASA520 security appliance with internet access and connected to the customer's SCADA or payment processing server) is configured to accept remote IPSEC site-to-site connections.



WEB
MANAGEMENT

3.6
IPSEC VPN

FATBOX G3 configuration
for Site-to-Site IPSEC VPN
(as of the example in the
previous page)

fatbox G3

MENU OPTIONS

Quick Start

LAN Ethernet

WAN Cellular

Port Forwarding

Dynamic DNS

IPSEC VPN

Serial Port

Management

System Status

Logout

Site-to-Site IKE PSK IPSEC Settings

3G IPSEC

VPN Server IP address

VPN Server Subnet IP Address/ Mask

Local VPN Subnet IP Address/ Mask

PSK Phasephrase

Start Mode (auto)

ISAKMP Phase 1

Encryption

Hash Algorithm

D-H Group

Phase 2

Encryption

Authentication (HMAC)

PFS Group

IKEv1 Agressive Mode

IKE SA Lifetime (s)

IPSEC Lifetime (s)

DPD Action

DPD Delay (s)

DPD Timeout (s)

UPDATE

1

1 = enable 0 = disable

start

start or route

aes128

E.g. 3des, aes128, aes192, aes256

sha1

E.g. 3des, aes128, aes192, aes256

modp1024

E.g. 1, 2, 5, 14..

aes128

E.g. 3des, aes128, aes192, aes256

sha1

E.g. md1, sha1, sha256

no

no = main mode yes = aggressive

10800

E.g. 10800

3600

E.g. 3600

restart

none, clear, hold or restart

30

E.g. 30

150

E.g. 150

UPDATE

1 = IPSEC enabled, 0 = IPSEC disabled

202.200.XXX.XXX (according to public IP assigned)

192.168.1.0/24 (according to network settings)

10.1.1.0/24 (according to network settings)

Set to match remote end settings

start = IPSEC tunnel will automatically be connected;
route = IPSEC tunnel will be connected when data is present

Settings to correspond with remote end settings

UPDATE and restart FATBOX

WEB
MANAGEMENT

3.7
SERIAL PORT

F ATBOX G3 has a built in TCP server to allow a remote device (e.g. a meter reading server) to connect over cellular network to device(s)* attached to the serial port of the FATBOX.

When the ‘Serial to TCP Transport’ is enabled, it allows for communication between the remote TCP client and the G3’s serial port (via port 70).

*
Note that only in the RS-485 mode can you connect multiple devices to the FATBOX.

fatbox G3

MENU OPTIONS Serial Port Management

Quick Start

- LAN Ethernet
- WAN Cellular
- Port Forwarding
- Dynamic DNS
- IPSEC VPN

- Serial Port**
- Management
- System Status
- Logout

Port Mode Selection 0 = RS232, 1 = RS485

Serial to TCP Transport (Server Port:70)

Enable 1 = enable 0 = disable

Speed E.g. 9600

Data Bits E.g. 8

Parity E.g. NONE, EVEN or ODD

Stop Bits E.g. 1

AT over Ethernet (115200, 8D, NS, 1S, Port:77)

Port Mode Selection 1 = enable 0 = disable

UPDATE

1 = TCP Server Enable,
0 = TCP Server Disable

Setting to match attached serial device

FATBOX G3 also allows messages (e.g. modem AT commands) to be send and received from the cellular modem via the LAN port (e.g. port 70). For example, an Ethernet attached Data Concentrator can send AT commands to the FATBOX (e.g. 192.168.1.1:77) to query signal strength (AT+CSQ) or to send custom SMS.

1 = Enable,
0 = Disable

Update and reboot FATBOX.

WEB MANAGEMENT

3.8 MANAGEMENT

SECURITY

Note that from the internet, the FATBOX can only be accessed via HTTPS (secure) to ensure all data between user and FATBOX web configuration page is encrypted.

Note:

We give our clients the choice to install their own signed certificate (e.g. Veri-sign or Digicert) via SSH to FATBOX console. Since there is no packaged signed SSL certificate in each FATBOX, a complaint of error might be issued from the browser. Note that this does not affect the secure encryption of data to configure the FATBOX via HTTPS.

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MENU OPTIONS System Management

Quick Start

LAN Ethernet
WAN Cellular
Port Forwarding
Dynamic DNS
IPSEC VPN
Serial Port
Management
System Status
Logout

Username

fatbox

Password

Enable Secure Shell (SSH)

☒ 1 = enable 0 = disable

Enable Log

☒ 1 = enable 0 = disable

UPDATE

Configuration Parameters Management

Please insert usb drive labelled 'FATBOX'.
Configuration files will be in folder \config.

UPLOAD FROM FATBOX

DOWNLOAD TO FATBOX

User Application Program Management

Please insert usb drive labelled 'FATBOX'.
File user.lua must be in \user folder.

DOWNLOAD TO FATBOX

EXECUTE PROGRAM

System Recovery Management

FACTORY SETTINGS

REBOOT SYSTEM

A user defined name to login to the FATBOX (web and SSH)

Please use a 'strong' password (upper, lower case and symbols)

Disabled by default. If enabled, will provide root access using the Password above.
1 = Enable, 0 = Disable (default)

If enabled, you can download/view the log page from the 'System Status' page.
1 = Enable, 0 = Disable (default)

To allow 'cloning' of parameter settings to multiple FATBOX in production environment, we utilize USB flash drives. This ensure only with physical access to the device and the settings (with sensitive data) be uploaded from a production FATBOX.

1. Format a USB thumb-drive (e.g. FAT32) and label it 'FATBOX'
2. After FATBOX is powered up and stable condition (e.g. signal strength LEDs are functioning), insert the thumb-drive into USB port (at antenna end of box)
3. Click 'Upload from FATBOX'; wait 5 sec, remove thumb-drive
4. Insert thumb-drive into new FATBOX (in stable operating condition) and click 'Download to FATBOX'; wait 5 sec and remove thumb-drive
5. Check in new FATBOX that parameters from other FATBOX has been copied over

WEB MANAGEMENT

3.8 MANAGEMENT

► INTEGRATION

FATBOX G3 has a powerful feature to allow end-users to write their own custom application program right on-board the router. This is cost, space and time efficient.

For example, a custom program can be written to check serial data read from a PLC and trigger an SMS to a technician for support or the program can check for I/O trigger from a relay to reboot the router.

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MENU OPTIONS

Quick Start
LAN Ethernet
WAN Cellular
Port Forwarding
Dynamic DNS
IPSEC VPN
Serial Port
Management
System Status
Logout

System Management

Username

fatbox

Password

Enable Secure Shell (SSH)

1

1 = enable 0 = disable

Enable Log

1

1 = enable 0 = disable

UPDATE

Configuration Parameters Management

Please insert usb drive labelled 'FATBOX'.
Configuration files will be in folder \config.

UPLOAD FROM FATBOX

DOWNLOAD TO FATBOX

User Application Program Management

Please insert usb drive labelled 'FATBOX'.
File user.lua must be in \user folder.

DOWNLOAD TO FATBOX

EXECUTE PROGRAM

System Recovery Management

FACTORY SETTINGS

REBOOT SYSTEM

To input your own LUA program:

1. Write your LUA program and name it as 'user.lua'
2. Save the program in \user folder in your thumb-drive (drive labelled 'FATBOX')
3. Insert the thumb-drive into FATBOX (in stable operating condition)
4. Click 'Download to FATBOX'; wait 5 sec, remove thumb-drive
5. You can click 'Execute Program' to test you program

Your user.lua program will automatically be executed after complete boot-up of the FATBOX.

Click 'Reboot' to soft reset the FATBOX device.

Click 'Factory Settings' to revert all parameters to factory default.

MENU OPTIONS	System Status	
Quick Start		
LAN Ethernet	Main	
WAN Cellular	Firmware Version	fw_G3_2_01
Port Forwarding	Uptime and CPU load (1,5,15m)	02:49:06 up 14 min, load average: 0. 22, 0. 13, 0.07
Dynamic DNS		
IPSEC VPN		
Serial Port	3G	
Managment	Interface	ppp0
System Status	IP Address	14.100.25.79
Logout		
	Ethernet Ports	
	LAN (eth0 + eth 1)	10.1.1.1
	IPSEC	
	Tunnel	
	SA	
	Diagnostics: Log file	

CONTACT US

Our Service Support means that we make the security and integration of the network our responsibility.

SERVICE
SUPPORT

TECHNICAL

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